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THE DYNAMICS OF FUNDAMENTALS IN CURRENCY CRISIS IN INDONESIA AND MALAYSIA

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Abstract. The impact of selected macroeconomic fundamentals on the market pressure (MP) is assessed using the third generation models based on 'Dusenberry' adaptive expectations. The findings are consistent with the general belief that weak macroeconomic fundamentals had triggered the speculative attacks against the Asian currencies. However, the macroeconomic variables and their dynamics that set the groundwork for a currency crisis differ considerably in Malaysia and Indonesia. A speculative attack against the Rupiah occurred in a generalized state of macroeconomic weakness while domestic credit growth, the fiscal balances-GDP ratio and the real exchange rate exerted strong influence on the exchange market pressure for Malaysia. In conclusion, while there are some common fundamentals matter for shifting market expectations and hence, market pressure in both countries, the dynamics that formed market expectations are divergent. Therefore, the belief that the Asian economies had the same characteristics that triggered the currency crisis in 1997 may be incorrect.

Keyword: currency crisis; Indonesia; Malaysia; fundamentals.

Abstrak. Kesan makroekonomi fundamental ke atas tekanan pasaran (MP) ditafsir menggunakan model generasi ketiga berasaskan jangkaan 'adaptif' Dusenberry. Hasil kajian ini tekal dengan anggapan umum bahawa fundamental makroekonomi yang lemah telah mengakibatkan serangan ke atas matawang negara-negara Asia. Walau bagaimanapun, variabel makroekonomi serta dinamik variabel tersebut yang membawa kepada krisis agak berbeza di Malaysia dan Indonesia. Serangan spekulatif terhadap rupiah berlaku dalam keadaan makroekonomi yang lemah manakala tekanan terhadap Ringgit Malaysia dikaitkan dengan pertumbuhan kredit, defisit fiskal dan kadar pertukaran benar. Kesimpulannya, fundamental yang mempengaruhi jangkaan pasaran dan seterusnya tekanan pasaran (MP) mungkin sama tetapi dinamik yang membentuk jangkaan pasaran amat berbeza. Oleh yang demikian, anggapan bahawa ekonomi Asian mempunyai ciri-ciri yang sama sehingga mengakibatkan krisis matawang 1997 mungkin tidak benar.

Kata kunci: krisis matawang; Indonesia; Malaysia; fundamental.

1.0 INTRODUCTION

The Asian economies including Malaysia, Thailand and Indonesia that were severely affected by the currency crisis of 1997-98, have prompted studies into

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their sudden economic decline and the emergence of widespread financial sector frailties. These countries were once the second tier 'dragons' or 'miracle economies' due to their impressive growth in the late 1980s and early 1990s. Empirical analyses that emerged mostly used panel data regression assuming that these Asian economies are similar in characteristics and in the fundamentals that trigger speculative attacks against their currencies. However, these Asian economies seem similar in a broad sense mainly due to their level of economic development and geographical proximity within South-East Asia. Moreover, even the common macroeconomic fundamentals will have varying degrees of influence on the economy.

This study sets out to confirm the belief that these countries are essentially heterogeneous. However, we focus is on 2 Asian economies, Malaysia and Indonesia, that contracted by 7% and 13%, respectively, following the speculative attacks. These two geographically close countries achieved high economic growth in the period prior to the crisis at 10% and 7.8% in 1996 for Malaysia and Indonesia, respectively. However, the pace of economic recovery was vastly different; Indonesia achieved a 3% growth (2001) compared to the 5.8% (1998) for Malaysia. The research has found that based on a common set of macroeconomic fundamentals in a model of country exchange market pressure (MP) (a high MP is defined as a currency crisis) in the setting of Duesenberry's adaptive expectations, the macroeconomic fundamentals that influence market expectations not only differ in importance but also in their dynamics. The macroeconomic fundamentals used here have been widely used in previous studies including those that focus on contagion and twin crisis such as Kaminsky and Reinhart (1999) and Caramazza *et al*. (2000). A survey on the characteristics of crisis economies in the 1980s and 1990s (Lim, 2005) have shown that domestic credit growth, the fiscal balances-GDP ratio, the real exchange rate, the current account balances-GDP ratio and the reserves-M2 ratio, have consistently shown similar behaviour in the pre-crisis period in the Mexican and Chilean crisis (1980s) and in Malaysia, Thailand, South Korea and Indonesia in 1997-1998. An examination of the macroeconomic fundamentals showed that the occurrence of a currency crisis have been more frequent in the case of Indonesia, whereby the current account-balance-GDP ratio and the reserves-M2 ratio, especially, have been persistently weak throughout the sample period of first quarter 1970 to fourth quarter 2001 (1970Q1-2001Q4). This research contributes to the enormous volume of empirical studies on the Asian crisis of 1997-98, mainly by focusing on specific countries. Unlike most previous empirical studies that pool a number of emerging economies in a panel data analysis,[1] a more accurate estimate and information is obtained from country specific analysis. This has serious implications for the implementation of policies

[1] This implicitly assumes that the impact effects of macroeconomic fundamentals on market pressure are the same across all the countries understudy.

to correct economic imbalances.[2] Section 1 reviews the theoretical literature and the empirical studies on currency crisis. Section 2 sets out the MP model for Malaysia and Indonesia based on Duesenberry adaptive expectations as well as the expected relationships between the exchange market pressure index (MP) and the macroeconomic variables. An overview of the data set for each country is presented in Section 3. The results of the empirical analysis for Malaysia and Indonesia are provided in Section 4, followed by conclusion in Section 5.

2.0 A REVIEW OF THE THEORETICAL LITERATURE AND PREVIOUS EMPIRICAL ANALYSIS

The models of currency crisis have evolved from the first generation models such as Krugman (1979) and Agenor *et al*. (1992) whereby expansionary monetary and fiscal policies that are inconsistent with the fixed exchange rate regime, lead to a gradual loss in reserves and ultimately to a speculative attack against the currency, which forces the abandonment of the fixed exchange rate. Second generation currency crisis models {(e.g. Krugman (1996) and Obstfeld (1996))} focus on instances when government policy reacts to changes in private behaviour or when the government faces an explicit trade-off between the fixed exchange rate policy and other macroeconomic goals. Changing market sentiments can alter government trade-off, which may make the subsequent devaluation a self-fulfilling crisis. Therefore, even when policies are consistent with the fixed exchange rate, attack-conditional changes can shift the economy from a good 'no attack' equilibrium to a bad 'attack' equilibrium. The second generation models have also extended the role of changing market expectations to 'contagion' in various forms: through trade spillover, 'monsoonal effects' or pure contagion. The first two effects are likely to be linked but pure contagion is generally ascribed to changes in market sentiments that are not linked to deteriorating macroeconomic fundamentals. Contagion may be caused by informational frictions and herding behaviour since the incentive of collecting country specific information may decline as the world capital markets grow {(e.g Masson (1999); Eichengreen *et al*. (1996); Flood and Marion (1998))}

The third generation models have extended the ideas of the first and second generation models (the role of fundamentals and market expectations) to embrace a wider open economy setting and have highlighted the importance of the highly integrated world capital market. The simultaneous financial and currency crisis are attributed to government policies (such as financial deregulation or explicit (or implicit) guarantee schemes) that are inconsistent with the fixed exchange rate; from where, moral hazard is present, when the government implicitly or

[2] Poolability test have rejected the null hypothesis that the slopes of the macroeconomic variables for the 4 Asian economies (including Malaysia and Indonesia) are homogeneous (Lim (2005)).

explicitly guarantees all liabilities of the private sector (bank deposits or corporate debts) (e.g. Aghion *et al*. (2001)). Even the belief that some borrowers are 'too big to fail' is a channel for the transmission of financial shocks since they may encourage capital inflows that banks eventually channel into risky or unprofitable projects. The banking sector plays a central role as the main intermediary in the financial system, especially in a developing country with an underdeveloped financial system {(Chang and Valesco (1998, 1999))}.

In a previous study of the theoretical models of currency crisis and a survey of the macroeconomic characteristics of 7 selected crisis economies in the 1980s and 1990s in Latin America and Asia, Lim (2005) concluded that all sectors of the economy should be considered when identifying vulnerabilities on the eve of a crisis. The country survey based on a set of selected macroeconomic variables found 5 macroeconomic variables that consistently behaved in the same manner in the period prior to a crisis in the 1980s and 1990s, specifically, domestic credit growth, the fiscal balances-GDP ratio, the real exchange rate, the current account balance-GDP ratio and reserves-M2 ratio (Lim, 2005).[3]

Bustelo's (2000) non-empirical analysis attributes the Asian financial crisis to over consumption and overinvestment, i.e., increase in domestic demand that may be driven by expansionary domestic policies that ultimately lead to high short-term external debt. He argued for the need for indicators of deficiencies that would capture financial fragility that is associated with financial deregulation and capital inflows. Kaminsky and Reinhart (1999) found that currency and financial crisis are normally preceded by recessions or below normal growth, attributable in part to deteriorating terms of trade, rising real appreciation and rising cost of credit. Caramazza *et al*. (2000) concluded that a country's vulnerability to a crisis lies in external weaknesses, domestic imbalances, reserves adequacy and sensitivity to trade and financial contagion. Declining growth and real appreciation increase the probability of crisis. Trade spillovers from a devaluation and output contraction of other countries are relevant for countries with weak external accounts.

3.0 METHODOLOGY

Despite the lack of a unifying theoretical model that links the strands of the first generation, the second generation and third generation currency crisis models, we believe that a currency crisis is the culmination of a multitude of macroeconomic imbalances. In this empirical analysis, 5 macroeconomic variables suggested by Lim (2005) were tested to determine, firstly, the impact effect of the macroeconomic variables on the market pressure of Malaysia and Indonesia; and secondly, to determine if country experiences differ significantly in terms of the models and the dynamics that explain the respective market pressures.

[3] Based on a set of selected 18 macroeconomic variables.

The market pressure variable, *MP*, is a weighted average of the change in the exchange rate and the loss in reserves, the weights being their respective variances. The nominal exchange rate is defined as the value of a US dollar measured in domestic currency. The relative importance of each variable for determining MP and the nominal exchange rate, is shown in the elasticities of MP in the long run, calculated at the regressor mean.

When the market perceives that the fundamentals (a credit boom, current account deficits, fiscal deficits, a real appreciation and declining reserves adequacy) are becoming increasingly inconsistent with the (implicit) peg, therefore, it launches an attack (sell) on the currency, inducing reserves losses and consequently, a high MP. Due to transactions costs, the market reacts to the changes in the state of the fundamentals with a lag. We argue that it is reasonable to expect that the current level of MP is determined by market expectations held in the previous period, of the state of the fundamentals in the next period. Therefore, any change in the nominal exchange rate is determined by '*expected*' values of the macroeconomic fundamentals in the current period and not by the actual values of those variables. Moreover, this is even more likely in an integrated and highly fluid world capital market, informational frictions (and possibly herding behaviour) and the growing disincentive for collecting country specific information.

The dynamic third generation currency crisis model of MP (for Malaysia and Indonesia, respectively) based on 'Duesenberry' adaptive expectations had been estimated as follows:[4]

$$MP_t = \alpha_0 + \underset{(+)}{\alpha_1 Dldcredit_{t-1}} + \underset{(-)}{\alpha_2 Bdef_{t-1}} + \underset{(+) \text{ or } (-)}{\alpha_3 \operatorname{Re} r_{t-1}} + \underset{(-)}{\alpha_4 Ca_{t-1}} + \underset{(+) \text{ or } (-)}{\alpha_5 RM2_{t-1}}$$

$$+ \underset{(+)}{\phi_1 \Delta Dldcredit_t} + \underset{(-)}{\phi_2 \Delta Bdef_t} + \underset{(+) \text{ or } (-)}{\phi_3 \Delta \operatorname{Re} r_t} + \underset{(-)}{\phi_4 \Delta Ca_t} + \underset{(+) \text{ or } (-)}{\phi_5 \Delta RM2_t} + \varepsilon_t \quad (1)$$

The definition of the variables used in this study is presented in Appendix 1.

The nominal exchange rate (under a flexible exchange rate) will tend to rise when the market expects domestic credit growth to rise in the next period. This impact will be magnified when the expected values are confirmed by the realized changes at the end of the current period. An expected increase in fiscal deficits will exert rising pressure on the nominal exchange rate since it may signal a loose fiscal policy stance that can increase aggregate demand and trigger inflationary pressure, increasing prices of non-tradable goods and contributing to a deteriorating trade balance.

[4] The modelling of market expectations of the macroeconomic variables using Koyck lags and the polynomial distributed lags have shown results and fit that are far inferior to the results obtained for this model.

An expected increase in the real exchange rate, i.e., a depreciating real exchange rate will tend to exert upward pressure on MP if the increase is driven by rising pressure on the nominal exchange rate in a fixed or tightly managed exchange rate regime. This is highly probable if the market perceives rising macroeconomic imbalances such as credit growth and rising stock of Non Performing Loans (NPLs) and current account imbalances. However, a rising real exchange rate can effectively improve the trade competitiveness of domestic exports. For small open economies highly dependent on exports (as in the case of our sample countries) declining trade and rising current account balances may signal impending economic slowdown. Closely related to this, an expected decline in reserves-M2 ratio, i.e., rising reserves inadequacy tends to increase MP since the market foresees that the stock of reserves will be inadequate to defend the exchange rate in the event of a speculative attack.

When a multitude of weak macroeconomic variables are expected in the near future, MP is more than likely to rise to extreme levels as pressure on the nominal exchange rate rises sharply and as a consequence, the low reserves are depleted. Therefore, a currency crisis happens under highly vulnerable macroeconomic conditions. When the expected levels of the macroeconomic variables are confirmed / realized by the changes at the end of the current period, then the impact on MP is magnified; this is assuming that the changes have the expected signs and are statistically significant.

4.0 THE BEHAVIOUR OF MP AND MACROECONOMIC VARIABLES FOR MALAYSIA AND INDONESIA OVER THE SAMPLE PERIOD 1970Q1 TO 2001Q4

Figure 1 shows the evolution of the main variables for Malaysia over the sample period. Domestic credit growth fell in the mid-1980s during the banking and economic crisis, recovering in the late 1980s following restructuring of the banking sector. For the large part of the sample period, there was deficit fiscal balances; fiscal surpluses were achieved from 1994 simultaneously with deficit current account balances. The reserves-M2 ratio began to increase after 1985. The crisis (third quarters of 1975 and 1997) are associated with real exchange rate depreciation and low levels of reserves-M2 ratio and current account deficits. In the earlier crisis there was low credit growth and large fiscal deficits but no excessively high credit growth or fiscal deficits in the 1997 crisis.[5] This suggests the influence of a different economic and financial environment in the 1990s.

[5] VIF (Variance Inflation Factor) tests for the possibility of multicollinearity find little evidence of collinearity in the Malaysia and Indonesia data sets (VIF range are 1.06-1.3 and 1.05-1.81, respectively) (Gujarati (1995) in Tan (2001)). With increasing multicollinearity in the data set model estimates become unstable and standard errors of coefficients are inflated.

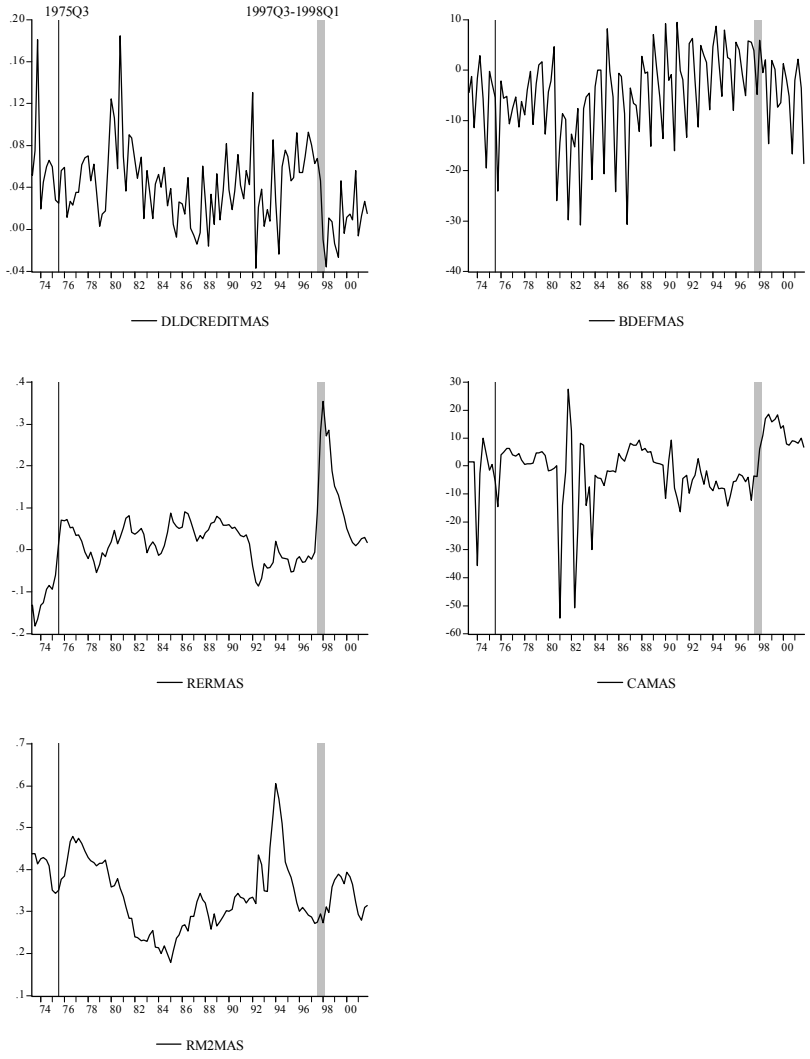

Figure 1 Malaysia: Evolution of selected variable

MP for Malaysia tends to be mean reverting, and was high during the 1974-1975 large current account deficits, in the early 1980s following the second oil crisis (and across the board fall in commodity prices) and the middle of the 1980s during the economic and banking crisis. International reserves tended to decline in the 2 years before a crisis while the nominal exchange rate tended to appreciate. Market pressure was generally low in 1993-1994 due to strong capital inflows. The reserve losses that are predicted to accelerate as market participants foresee a speculative attack on the currency is less apparent in the recent crisis. As shown in Figure 2 (components of MP) reserves losses constitute a very small proportion

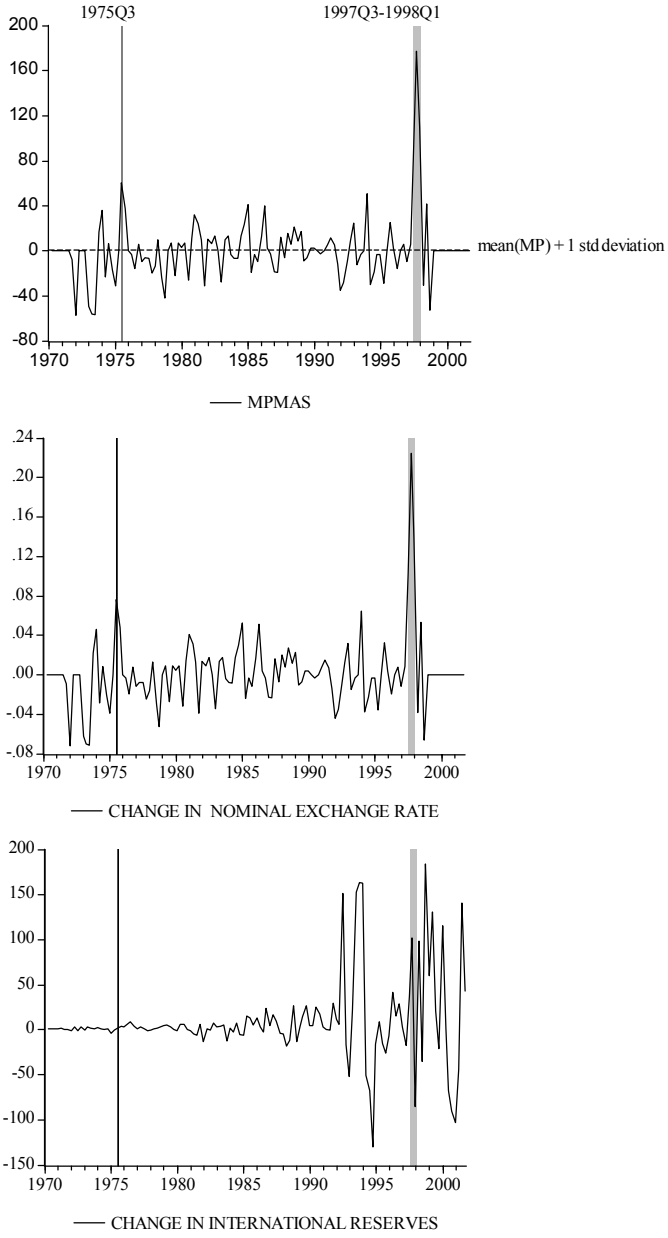

Figure 2 Malaysia: Mp and components

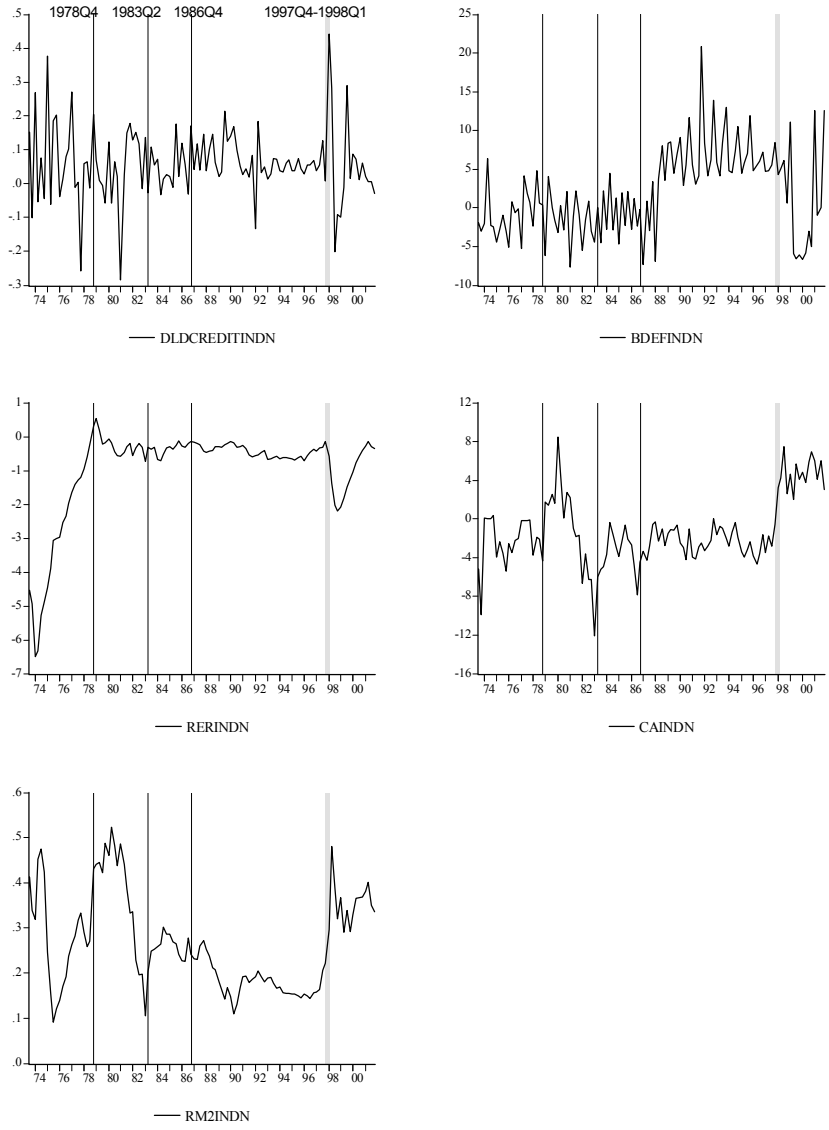

Figure 3 Indonesia: Evolution of selected variables

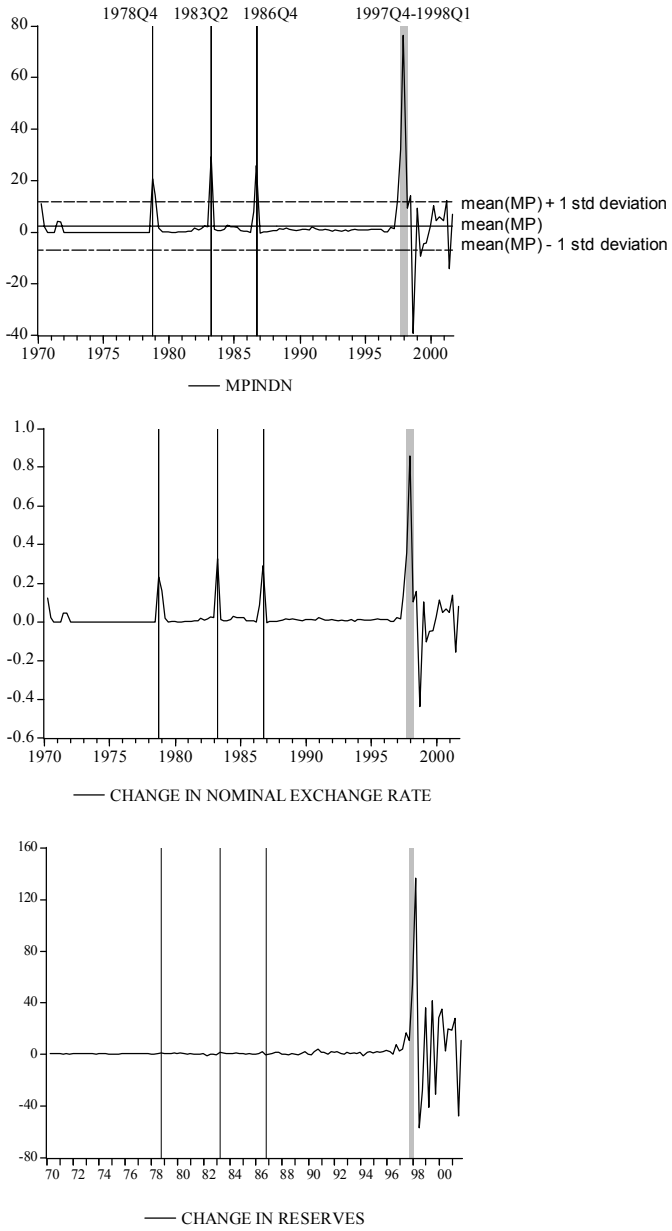

Figure 4 Indonesia: Mp and components

of MP mainly because of its large variance. MP is driven by the change in reserves during the early 1970s and late 1990s. Reserves losses remain important because of the economy's dependence on international trade.

Figure 3 shows the evolution of the main variables for Indonesia over the period 1970Q1-2001Q4. Generally, credit growth remained low and rising at the time of crisis except in 1983. Fiscal surpluses were achieved from about 1989. Indonesia had experienced current account deficits for most of the period except during 1979-1981. The reserves-M2 ratio was generally low till the onset of the 1997 crisis. All the crisis are generally associated with low credit growth, current account deficits, fiscal deficits (except the recent crisis), some real exchange rate appreciation (except the 1978 crisis) and low reserves-M2 ratios (especially from the 1980s).

Movement in MP for Indonesia is marked by two crisis after 1978 and is clustered in the 1990s. Between 1970s and 1996, there were three separate occasions of depreciating pressure on the nominal exchange rate. Declining reserves were less apparent in the recent crisis. Market pressure remained volatile after the 1998 crisis, aggravated by political uncertainties in 1999 and 2000. The change in the nominal exchange rate constitutes 99.99%-100% of MP for Indonesia. The low MP before 1978 was driven by rising international reserves associated with the 1970s oil price shocks. The significance of reserves for maintaining the exchange is apparent in the 1990s; the spikes in Figure 4 show depreciating pressure on the crawling peg and rising reserves losses in 1997-98.

Clearly, currency crisis has been more frequent in Indonesia. The state of the macroeconomic fundamentals were common to the extent that both countries had current account deficit during a crisis (in the 1990s in Malaysia and more persistently for Indonesia). In both cases, MP tended to rise to extreme (crisis) levels when macroeconomic fundamentals were weak. If a generalized state of weak fundamentals tended to push MP for Indonesia to high (crisis) levels, the movements in MP for Malaysia were influenced by slightly different macroeconomic fundamentals; MP was associated with fiscal deficits in the 1970s but domestic credit growth gained prominence in the 1990s.

5.0 DATA ANALYSIS

The data for Malaysia are generally stationary. ADF and Phillip-Perron tests show that MP for Malaysia, domestic credit growth, the real exchange rate (Rer) and the current account-GDP ratio (Ca) are $I(0)$. These variables are zero-mean, stationary processes except for domestic credit growth. The fiscal balances-GDP ratio is stationary around a linear trend at 1% significance (5% by the ADF test). The reserves-M2 ratio is $I(1)$. Therefore, the first difference of reserves-M2 ratio (denoted ÄRM2) is used in estimation.

The Indonesia macroeconomic variables are stationary. MP and domestic credit growth are stationary zero mean processes at the 1% significance level according

to ADF and Phillip-Perron tests. The fiscal balances-GDP ratio and the real exchange rate are stationary, zero-mean processes according to the Phillip-Perron tests. The current account balances–GDP ratio is stationary around a linear trend. The reserves-M2 ratio, assuming a non-zero mean, are also $I(0)$. (Appendix 2 details the results of the unit root tests)

6.0 EMPIRICAL ANALYSIS AND DISCUSSION

The estimates for the Malaysia MP model based on 'Duesenberry' adaptive expectations is shown in Table 1. The estimates are unbiased, consistent but may be inefficient, and the RESET test indicates correct functional form. The Hausman-Wu test shows that the residuals are also independent of the explanatory variables. A stable AR(1) process is included to correct for autocorrelation (the inverted root has a modulus less than 1).

The MP Malaysia equation has a statistically significant negative intercept. The model is significant at 1% with $\overline{R}^2 = 0.94$. The fitted MP tracks the actual MP very closely except at the extreme ends of the sample period (see Figure 5). The poor fit for the early 1970s is due to the lack of data; the extreme volatility in 1999 is underestimated perhaps due to the lack of pertinent data, e.g. the external liabilities.

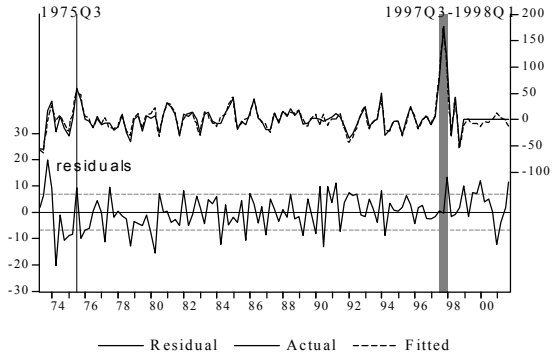

Figure 5 Malaysia: Actual and fitted values of MP

In the MP equation, the expected increase in domestic credit growth and the deficit fiscal balances-GDP ratio have the anticipated signs. The expected depreciation and actual increase in the real exchange rate tend to exert upward pressure on MP. All the variables are significant at the 5% significance level.

At the regressor mean, a one percent expected increase in domestic credit growth and in the fiscal deficits-GDP ratio will raise MP by 0.6% and 0.4% respectively. Of all the macroeconomic variables, the real exchange rate is evidently the most crucial for Malaysia; a 1% expected depreciation results in a net 1.4%

Table 1 Least squares estimations of market pressure (Mp)

	MALAYSIA		INDONESIA	
Variable	**Coefficient (Std error)**	**Elasticity (sample mean)**	**Coefficient (Std error)**	**Elasticity (sample mean)**
Constant	-3.341** (1.597)		–	
DLDCREDIT(-1)	38.311** (18.423)	0.64	21.191** (10.809)	0.505
∇(DLDCREDIT)	–	–	22.672* (7.517)	-0.01
BDEF(-1)	-0.207* 0.07)	0.39	–	
D(BDEF)	–	–	–	
RER(-1)	118.80* (15.414)	1.087	1.541*** (0.834)	-0.60
D(RER)	883.511* (22.853)	0.301	–	
CA(-1)	–		-0.748** (0.292)	0.40
∇(CA)	–		1.481* (0.52)	0.02
RM2(-1)	–		8.955*** (5.19)	0.94
∇(RM2)	–		70.323* (16.76)	-0.01
AR(1)	0.517* (0.083)		AR(2) 0.3026* (0.098)	
Inverted AR	roots: 0.52		0.55 -0.55	
Summary statistics			**Summary statistics**	
R^2	0.94		0.25	
Regression s. e.	6.91		8.60	
RSS	5192.25		7918.54	
No. observations	115		114	
Sample period	1973Q2-2001Q4		1973Q3-2001Q4	
Diagnostics				
Normality test	0.73 (0.69)		2173.3 (0.00)	
Serial correlation (2 lags)	1.18 (0.76)		1.44 (0.49)	
ARCH effects	0.55 (0.45)		12.34 (0.14)	
Heteroscedasticity	25.88 (0.03)		81.77 (0.00)	
RESET test	1.13 (0.71)		1.42 (0.23)	

Note:
*, **, and *** denote 1%, 5% and 10% significance level.

rise in MP (expected depreciation itself raised MP by 1.1%). In this specification, the influence of the other variables (the current account balance-GDP ratio and the reserves-M2 ratio) is probably subsumed in the real exchange rate.

For Indonesia, the model estimates are consistent but inefficient. The = 0.25, strongly indicate the omission of some pertinent variables. Despite the possible omitted variable bias, the model still provides some information regarding the macroeconomic fundamentals that have significant influence on market expectations and MP. The RESET test does not indicate incorrect functional form despite non-normality in the residuals. The presence of heteroscedasticity captured the outlier effects. The residuals are independent of the regressors. Table 2 (right panel) shows the estimation results for Indonesia. Figure 6 shows the fitted and actual values of MP. The fitted values track the actual values quite closely, predicting accurately the 1978 crisis but underestimating the magnitude of the other crisis, although showing the expected rise at the appropriate crisis points.

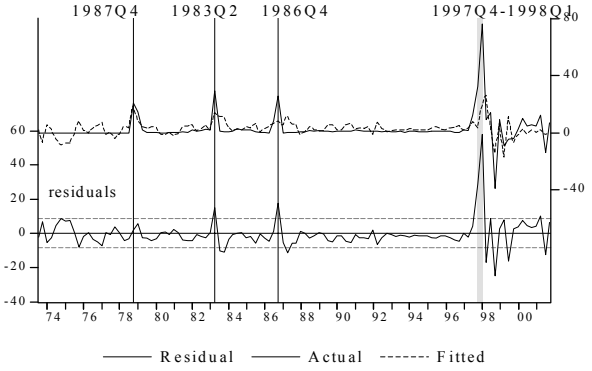

Figure 6 Indonesia: Actual and fitted values of MP

The variables in this model are jointly significantly different from zero at 1%. The effect of the expectations of domestic credit growth, the real exchange rate, the reserves-M2 ratio and the current account–GDP ratio are significant at 5%-10% and the realized changes (or current period trend) for credit growth and the reserves-M2 ratio are significant at 1%. The variables have the expected signs and an increase in the reserves-M2 ratio and an expected depreciation tend to increase MP. At the mean, a 1% expected increase in reserves-M2 ratio raises MP by 0.94% and for an expected real appreciation, by 0.6%. MP rises by 0.4% due an expected increase in deficit current account balances. Expected domestic credit growth raises MP by a half percent. The realized changes in domestic credit growth and the reserves-M2 ratio marginally lower their respective impact on MP. Therefore, according to our model specification for Indonesia, an expected increase in the

reserves-M2 ratio and a real exchange rate appreciation are the most important variables that affect MP.

To summarise, the fundamentals that render Malaysia and Indonesia vulnerable to a currency crisis are the real exchange rate and domestic credit growth. These are indications of incompatible domestic policies with the implicit pegs of their currencies. In the 1980s, expansionary fiscal policy associated with high oil prices and domestic credit expansion following partial financial liberalization in Indonesia lead to inflationary pressure and an appreciating real exchange rate. These macroeconomic imbalances culminated in current account deficits and growing reserves inadequacy. The crisis in the 1990s are very likely linked to the major financial liberalization measures that were adopted in both countries, which led to vast foreign capital inflows, rapid growth in domestic lending and the resultant rising stock of NPLs and external debts. For the Malaysian economy, declining trade surpluses associated with weak world electronic demand and an appreciating real exchange rate eroded trade competitiveness especially compared to low cost countries like China and Vietnam. Rising interest rate drew in more foreign capital effectively escalated the debt servicing obligations of the private sector. The openness of the economy, rising macroeconomic weaknesses and growing external debts (with rising short term debts) increased the vulnerability of the economy to shocks. In the second quarter of 1997 the Malaysian ringgit came under intense pressure when the Baht came under intensive attack. In Indonesia, major reforms in the domestic financial market (1998) and foreign investment laws in 1994 drew in foreign capital which largely went to the private sector, intermediated by domestic private banks. The Rupiah effectively appreciated and became less competitive. Slowing economic growth, current account deficits, rising short-term debts and NPLs rendered the economy highly vulnerable to weak market sentiments and shocks in the region. The different dynamics (evident in the empirical analysis) also underscores their heterogeneity and underscores the importance of country specific analysis. A common policy recommendation for a set of 'seemingly similar' countries can have detrimental effects on the economy. This concurs with the findings of Abdul Abiad (2003) who strongly suggested the need to firstly determine those macroeconomic fundamentals are similar before embarking on panel data estimation for the reason stated above.

7.0 CONCLUSION

The models of MP for Malaysia and Indonesia, based on 'Duesenberry' adaptive expectations imply that market expectations of the macroeconomic variables are determined by market's past knowledge of the macroeconomic variables and the trend of their variables in the current period. As we have expected, countries may have similar economic characteristics in a broad sense but the dynamics of the macroeconomic variables that influence MP differ considerably. What they have

in common is the crucial role of the real exchange rate for forming market expectations. In both instances, MP rises with market expectations of a depreciation (and the realized increase in the real exchange rate). This is not unexpected given the way MP is defined. Domestic credit growth is also very important for Malaysia. MP for Indonesia is also strongly influenced by market expectations of the fiscal balances-GDP ratio and reserves adequacy. A rising trend in reserves-M2 ratio exerts pressure on MP indicating the potentially adverse effects when strong capital inflow trends come to a sudden stop and reverse. Our findings further confirms the diversity in Asian countries and iterates that a standard policy prescription for a group of crisis economies may be inappropriate considering their underlying differences. The currency crisis should be analyzed on an individual country basis.

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APPENDIX 1

Definition of estimated variables

Variable	Symbol	Definition
Market pressure	MP	Market pressure is a weighted average of the change in exchange rate and the change (losses) in international reserves, and the weights are equal to the inverse of the variances of the variables.
Domestic credit growth	Dldcredit	Domestic credit growth is measured as a first difference of the natural logarithm of domestic credit. Domestic credit growth is expected to have a positive effect on MP.
Fiscal balances-GDP ratio	Bdef	Fiscal balances-GDP ratio is derived by dividing fiscal balances (IFS line 680..ZF) with nominal GDP (line 699..ZF) and the product multiplied by 100. It is expected to have a negative effect on market pressure, i.e. rising fiscal surpluses (fiscal prudence) should exert downward pressure on market pressure (other things being equal).
Real exchange rate	Rer	The real exchange rate is measured in two steps. We first take the natural logarithms of the average exchange rate (IFS line RF) multiplied by US consumer price index (line USI63) divided by domestic consumer price index (IFS line 63). Second, subtract the first figure from their past 12-quarter average. This two-step procedure is a measure of the deviation of real exchange rate from its three years previous average. A positive (negative) real exchange rate indicates a real depreciation (appreciation). Real exchange rate can have a positive or a negative effect on MP. (Kaminsky and Reinhart (1999), Corsetti *et al*. (1998) and Sachs *et al*. (1996).
Current account-GDP ratio	Ca	Current account balances-GDP ratio is obtained by converting current account balances (IFS line 878) to domestic currency values using period average exchange rates (IFS line RF) and dividing the product by nominal GDP (IFS line 899..ZF) multiplied by 100. It is expected to have a negative impact on market pressure since rising current account balances may imply an accumulation of reserves sufficient to defend the currency in the event of a depreciating speculative attack.
Reserves-M2 ratio	RM2	The reserves to broad money ratio is derived as foreign reserves (IFS line 11d) converted to domestic currency values using end of period exchange rate (IFS line AE) divided by broad money (IFS lines 34 plus 35). This variable measures reserves adequacy or financial fragility. It can have a positive or negative impact on market pressure.

APPENDIX 2

Unit root tests

Variable	Malaysia Data Set			Indonesia Data Set		
		ADF	Phillip-Perron		ADF	Phillip-Perron
MP	statistic No. of lags No intercept, no trend	-7.48* 0	-7.3* 4	statistic No. of lags No intercept, no trend	-6.87* 2	-8.53* 2
Dldcredit	statistic No. of lags No intercept, no trend	-2.19** 2	-5.12* 4	statistic No. of lags No intercept, no trend	-5.375* 1	-9.48* 4
Bdef	statistic No. of lags Intercept, trend	-3.15* 9	-11.44* 10	statistic No. of lags No intercept, no trend	-2.25* 6	-6.68* 4
Rer	statistic No. of lags No intercept, no trend	-3.59* 1	-2.78*** 4	statistic No. of lags No intercept, no trend	-2.46** 1	-1.77*** 6
Ca	statistic No. of lags No intercept, no trend (variable in first differences)	-2.41* 4	-7.155* 4	statistic No. of lags Intercept, trend	-4.22** 1	-7.2* 7
RM2	statistic No. of lags No intercept, no trend	-9.21* 0	-9.12* 4	statistic No. of lags Intercept, no trend	-3.02** 0	-3.18** 4

Note: *, **, *** denote 1%, 5% and 10% significance level.